Comprehensive®

Cable and Connectivity Company

Electronics

CSW-RGBHV88A Matrix Switchers System

User Manual

www.comprehensivecable.com

Call toll free: 800 526-0242 email: customerservice@comprehensivecable.com

Notice：

This **RGBHV Matrix Switchers User Manual** takes example of the Matrix model MRG88A. It can be use d as user 's manual of other RGBHV matrix switcher models.

This manual is only an instruction for operators, not for any maintenance u sage. The functions described in this version are updated till Jan 2010. Any changes of functions and parameters sin ce then will be informed separat ely. Please refer to the dealers for the latest details.

This manual is copyright PTN Electronics Limited. All rights reserved. No p art of this publication may be copied or reproduced without the prior written consent of PTN Electronics Limited.

All product function is valid till 2010-1-1

⚠ Safety Operation Guide

SAFETY PRECAUTIONS

Please read all instructions before attempting to unpack, install or operate this equipment and before connecting the power supply.

Please keep the following in mind as you unpack and install this equipment:

- Always follow basic safety precaution to reduce the risk of fire, electrical shock and injury to persons.
- To prevent fire or shock hazard, do not expose the unit to rain, moisture or install this product near water.
- Never spill liquid of any kind on or into this product.
- Never push an object of any kind into this product through any openings or empty slots in the unit, as you may damage parts inside the unit.
- Do not attach the power supply cabling to building surfaces.
- Use only the supplied power supply unit (PSU). Do not use the PSU if it is damaged.
- Do not allow anything to rest on the power cabling or allow any weight to be placed upon it or any person walk on it.
- To protect the unit from overheating, do not block any vents or openings in the unit housing that provide ventilation and allow for sufficient space for air circulate around the unit.

Contents

1. INTRODUCTION 1

1.1 About MRG Matrix Switcher System 1
1.2 MRG Matrix Switcher Models 1

2. PACKING OF THE PRODUCT 3

3. INSTALLATION 3

4. FRONT VIEW AND REAR VIEW OF THE PRODUCT 4

4.1 Front View of the RGBHV88A 4
4.2 Rear View of the RGBHV88A 4
4.3 Front View of theRGBHV88A 5
4.4 Rear View of the RGBHV88A 5
4.5 Front View of the RGBHV88A 6
4.6 Rear View of the RGBHV88A 6

5. EXTERNAL CONNECTION 7

5.1 Introduction of the Input and Output Connectors 7
5.2 Connection of RS-232 Communication Port 7
5.2.1 Connection with Control Systems 8
5.2.2 Connection with Computer 8
5.3 How to Connect with the Input and Output Terminals 8

6. OPERATION OF THE CONTROL PANEL 9

6.1 Front Panel Description 9
6.2 Command Format of the Switching Operation 10
6.3 Examples of Operation 10

7. USAGE OF THE REMOTE CONTROLLER 10

8. COMMUNICATION PROTOCOL AND COMMAND CODES 11

9. TECHNICAL SPECIFICATIONS 14

10. SYSTEM DIAGRAM 14

11. TROUBLESHOOTING & MAINTENANCE 15

1. Introduction

1.1 About MRG Matrix Switcher System

MRG series Matrix switcher is a high-performance professional computer and audio signal switcher that can be used for cross switching of multi computer and audio signal. Independent RGBHV component and balanced/unbalanced I/O terminals make each component signal transmit and switch separately; this design can reduce attenuation of signal transmission to minimum and output the image and audio signal in high-fidelity quality.

MRG series switcher mostly apply in broadcasting TV engineering, multi-media meeting room, big screen display engineering, television education, command control center etc. It provides power-fail locale protection function, LED indicating, A/V timing & separating switching function. With RS232 interface, it can be worked with PC, remote control system and any other far-end control system devices. The user manual takes MRG88A as example, other models can take reference from it too.

⊢ 1-1

1.2 MRG Matrix Switcher Models

According to different situation and users, the MRG series can be classified into the following models:

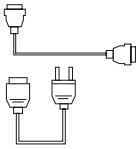
Specifications / Models	Video Inputs	Video Outputs	Audio Inputs	Audio Outputs	RS232 Interface
MRG82	8	2	×	×	√
MRG82A	8	2	8	2	√
MRG84	8	4	×	×	√
MRG84A	8	4	8	4	√
MRG88	8	8	×	×	√
MRG88A	8	8	8	8	√
MRG164	16	4	×	×	√
MRG164A	16	4	16	4	√

RGBHV/Stereo Audio Matrix Switcher

Specifications / Models	Video Inputs	Video Outputs	Audio Inputs	Audio Outputs	RS232 Interface
MRG168	16	8	×	×	√
MRG168A	16	8	16	8	√
MRG1616	16	16	×	×	√
MRG1616A	16	16	16	16	√
MRG248	24	8	×	×	√
MRG248A	24	8	24	8	√
MRG2416	24	16	×	×	√
MRG2416A	24	16	24	16	√
MRG2424	24	24	×	×	√
MRG2424A	24	24	24	24	√
MRG328	32	8	×	×	√
MRG328A	32	8	32	8	√
MRG3216	32	16	×	×	√
MRG3216A	32	16	32	16	√
MRG3224	32	24	×	×	√
MRG3224A	32	32	32	24	√
MRG3232	32	32	×	×	√
MRG3232A	32	32	32	32	√
All modules above are for combined case design.					
MRG4824	48	24	×	×	√
MRG4832	48	32	×	×	√
MRG4848	48	48	×	×	√
MRG6424	64	24	×	×	√
MRG6432	64	32	×	×	√
MRG6448	64	48	×	×	√
MRG6464	64	64	×	×	√
MRG9664	96	64	×	×	√
MRG9696	96	96	×	×	√
MRG12864	128	64	×	×	√
MRG12896	128	96	×	×	√
MRG128128	128	128	×	×	√
All modules above are for separated case design, audio case is the optional accessory. There will be wider bandwidth.					

2. Packing of the Product

MRG Matrix Switcher



RS-232 Communication Cord

Power Supply Cord

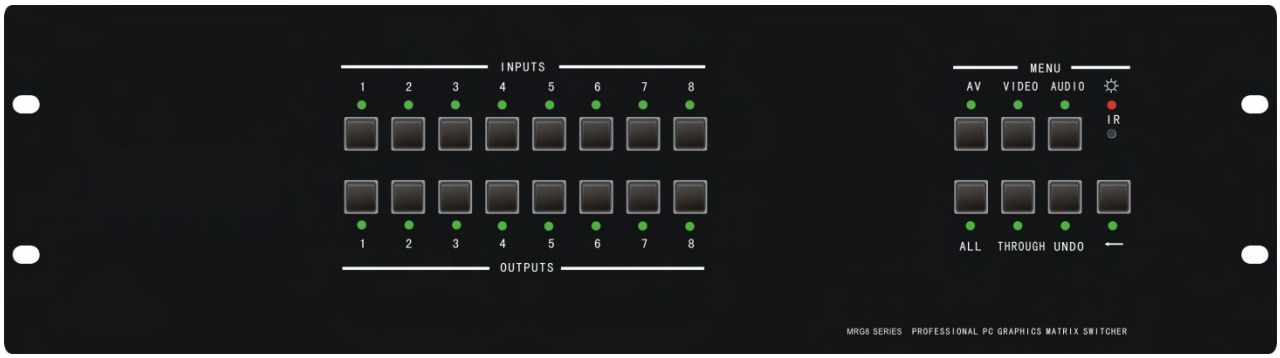
CD with Application **SWITCHER 2.0**

3. Installation

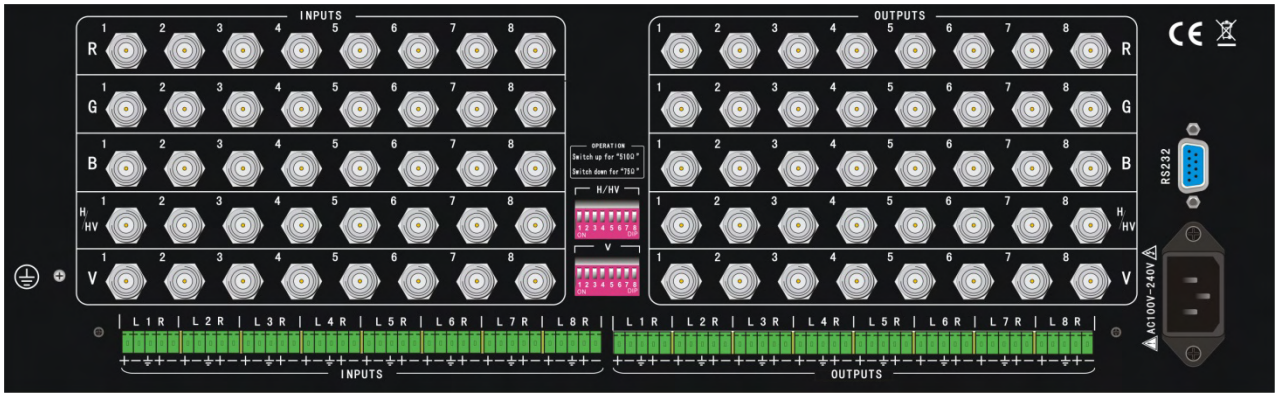
MRG matrix switchers adopt metal shell and can be stacked with other device. Moreover, they are rack-mountable enclosure and can be installed in the standard 19 inches case.

4. Front View and Rear View of the Product

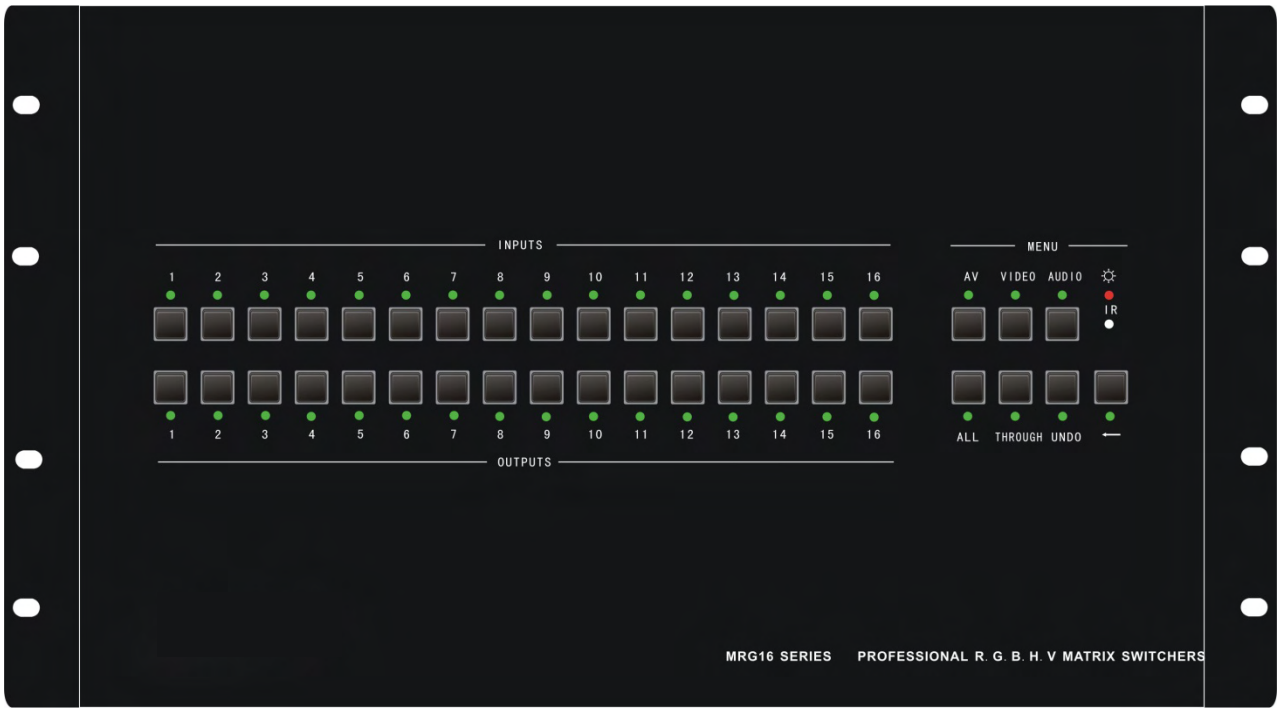
4.1 Front View of the CSW-RGBHV88A



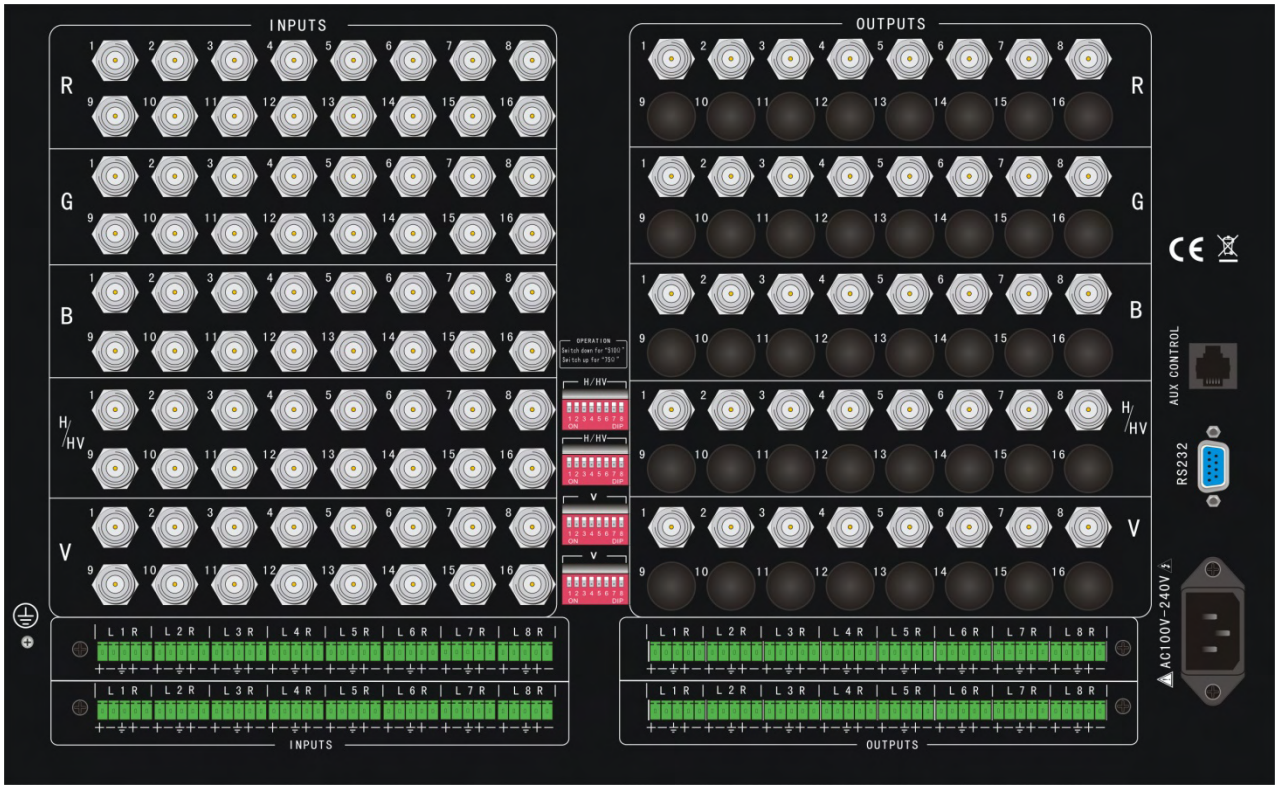
4.2 Rear View of the CSW-RGBHV88A



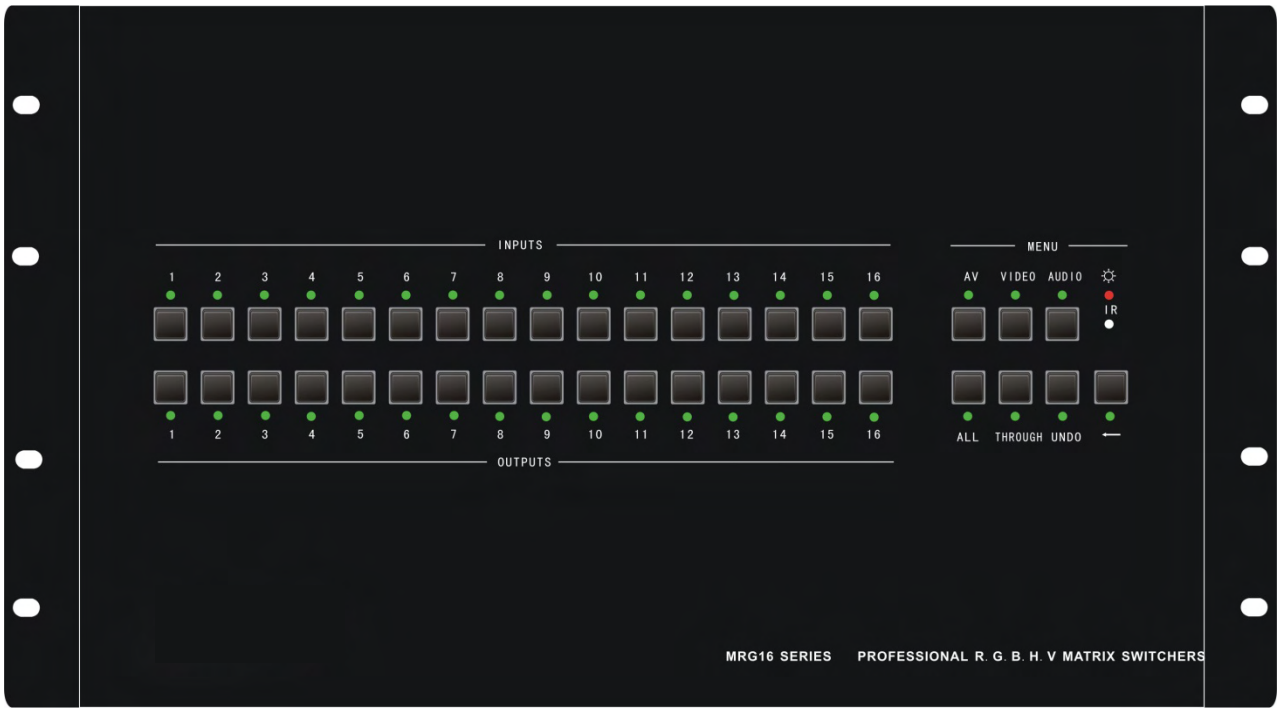
4.3 Front View of the CSW-RGBHV88A


INPUTS
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
MENU
AV VIDEO AUDIO
IR
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
ALL THROUGH UNDO
OUTPUTS
MRG16 SERIES PROFESSIONAL R. G. B. H. V MATRIX SWITCHERS

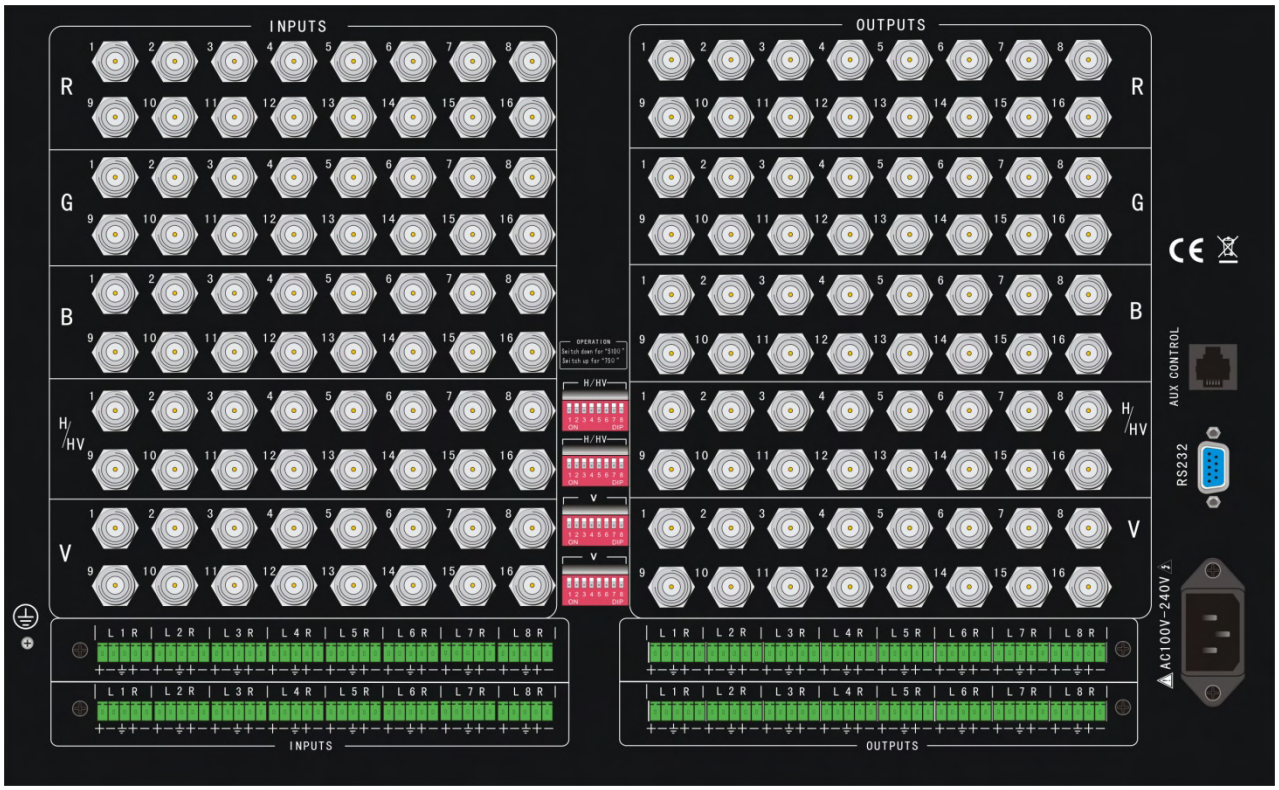
4.4 Rear View of the CSW-RGBHV88A



4.5 Front View of the CSW-RGBHV88A


INPUTS
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
MENU
AV VIDEO AUDIO
IR
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
ALL THROUGH UNDO
OUTPUTS
MRG16 SERIES PROFESSIONAL R. G. B. H. V MATRIX SWITCHERS

4.6 Rear View of the CSW-RGBHV88A



Some more models:

MRV 24 channels series
MRV 32 channels series
MRV 48 channels series
MRV 64 channels series
MRV 96 channels series
MRV128 channels series

5. External Connection

5.1 Introduction of the Input and Output Connectors

According to different type of matrix, computer signal I/O interface are make up of Channel 8, Channel 16, Channel 24, Channel 32, Channel 48, Channel 64, Channel 96, Channel 128 BNC female terminals, audio signal I/O terminals are make up of Channel 2, Channel 4, Channel 8, Channel 16, Channel 24, Channel 32, Channel 48, Channel 64, Channel 96, Channel 128 3.8mm captive screw connectors. The channel number of MRG16X16 computer signal I/O terminals are form Channel 1 to Channel 16(form left to right, display in two rows), The interfaces are R, G, B, H, V signal terminals of the computer(form up to down),the channel number of audio signal I/O terminals are form Channel 1 to Channel 16(from left to right).Please refer to shell silk-screen figure about other types of interface.

5.2 Connection of RS-232 Communication Port

Except the front control panel, the MRG matrix switcher can be control by far-end control system (Such as PC,CRESTRON control system, AMX control system) or through the Ethernet control via the RS-232 communication port.

This RS-232 communication port is a female 9-pin D connector. The definition of its pins is as the table below.

Pin No.	Name	Function
1	N/u	Unused
2	Tx	Transmit
3	Rx	Receive
4	N/u	Unused
5	Gnd	Ground
6	N/u	Unused
7	N/u	Unused
8	N/u	Unused
9	N/u	Unused

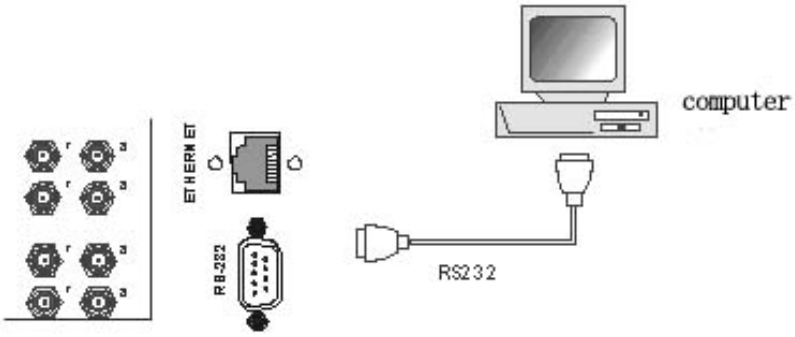
5.2.1 Connection with Control Systems

With the RS-232 port, the MRG matrix switchers can be control by several kinds of control systems.

5.2.2 Connection with Computer

When the switcher connects to the COM1 or COM2 of the computer with control software, users can control it by that computer.

To control the switcher, users may use the RS232 software



F 5-1 Connection between MRG matrix switcher and the computer

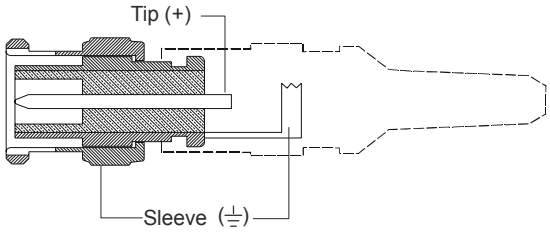
5.3 How to Connect with the Input and Output Terminals

The MRG matrix switchers may take DVD players, computers, graphic workstations and digital showing platform as their input signal source, and projectors, video recorders, displayers and amplifiers as their output signal destinations according to different situation.

RGBHV connection:

The MRG matrix switchers support the Composite Video, Component Video (YPbPr), Super Video (YC) and VGA signal source. RGBHV signal output terminals or YC output terminals are needed in AV device; RGBHV signal output terminals are needed in VGA device.

The BNC connector is shown as the figure below.



BNC Connector

If the VGA device doesn't with RGBHV output terminals, please convert the signals with a VGA to RGBHV switcher for getting high quality MRG output effects.

Please use the special five core RGBHV signal cord to connect the input and output devices and connect the BNC connector R(red)、G（green）、B（blue）、H（horizontal）、V（vertical）carefully.

Attention:

Please make sure the RGBHV connectors from the source and to the destination should be in the same order, otherwise it world cause color loss or no output signal at all.

Audio signal connection:

"AUDIO INPUT", "AUDIO OUTPUTS" audio network interface in RGBHV matrix switchers can be connected to the audio signal and amplify of the DVD player.

Audio connection is complicated than video. It has two kinds of connection: balanced and unbalanced. The balanced connection transmits a pair of balanced signals with two signal cords. Because interferences will have the same intensity and the opposite phases on the two signal cords, it will be counteracted in the end. For the low frequency extent of the audio signal, it would be easily interfered under long distance transmission. Therefore, as an anti-interference connection , it is mostly used in audio connection of special device.

The unbalanced connection transmits signals only with a signal cord. Without counteraction, it can be interfered more easily. Accordingly, it is adopted for household appliance or some cases with low technical demand.

Take the audio signal line for example: 1.Unbalanced: pin “G” connect to SLEEVE, pin “+” connect to TIP, pin “–” connect to pin “G”; 2.Balanced: pin “G” connect to SLEEVE, pin “–” connect to RING, pin “+” connect to TIP. As shown in the F 6-3:

F 5-3 Balanced/unbalanced connection on captive screw connector

To select which connection is up to the interface of the device. When available, the balanced connection is the first choice. Before connection, please read the command or relevant demand in the user manual carefully. In some cases, maybe there is balanced in source signal end but unbalanced in the destination end. If in a nonstandard case, it is done to connect balanced for the balanced end and unbalanced for unbalanced end. But if in a standard one, the converter must be used to switch the signals as the same, balanced or unbalanced.

6. Operation of the Control Panel

6.1 Front Panel Description

“AV” AV synchronal button: To transfer video and audio signal synchronously by the switcher

Example: To transfer both the video and the audio signals from input channel No.3 to output channel No.4.

Operation: Press buttons in this order “AV”,“3”,, “4””.

“VIDEO” Video button: To transfer only video signals from input channel to output channel

Example: To transfer video signals from input channel No.3 to output channel No.4.

Operation: Press buttons in this order “VIDEO”, “3”, “4”.

“AUDIO” Audio button: To transfer only audio signals from input channel to output channel

Example: To transfer audio signals from input channel No.2 to output channel No.3.

Operation: Press buttons in this order ““AUDIO”, “2”, “3””.

“1,2,3,4” I/O Keypads: Keys to select I/O channels.

Example: To transfer input channel No.3 to output channel No.1

Operation: Press buttons in this order : “3” in INPUT area, “1” in OUTPUT area.

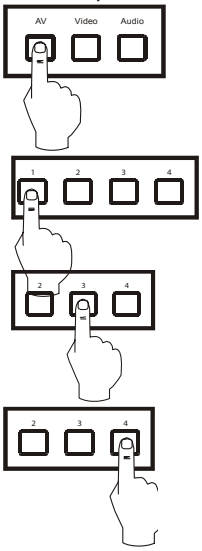
6.2 Command Format of the Switching Operation

With the front control panel, the switcher could be control directly and rapidly by pressing the buttons under below format.
“Menu” +“Input Channel” +“Output Channel 1”

“Menu”: “AV”, “Audio”, “Video”
“Input Channel”: Fill with the number of input channel to be controlled
“Output Channel”: Fill with the number of output channels to be controlled

6.3 Examples of Operation

Example 1：To transfer video and audio signals from input channel No.1 to output channel No.3,4



1, Press the button for switching mode “AV” for the switching mode of video and audio (“Audio” for the switching mode of audio only; “Video” for the switching mode of video only)

2, Press the button for input channel number“1”

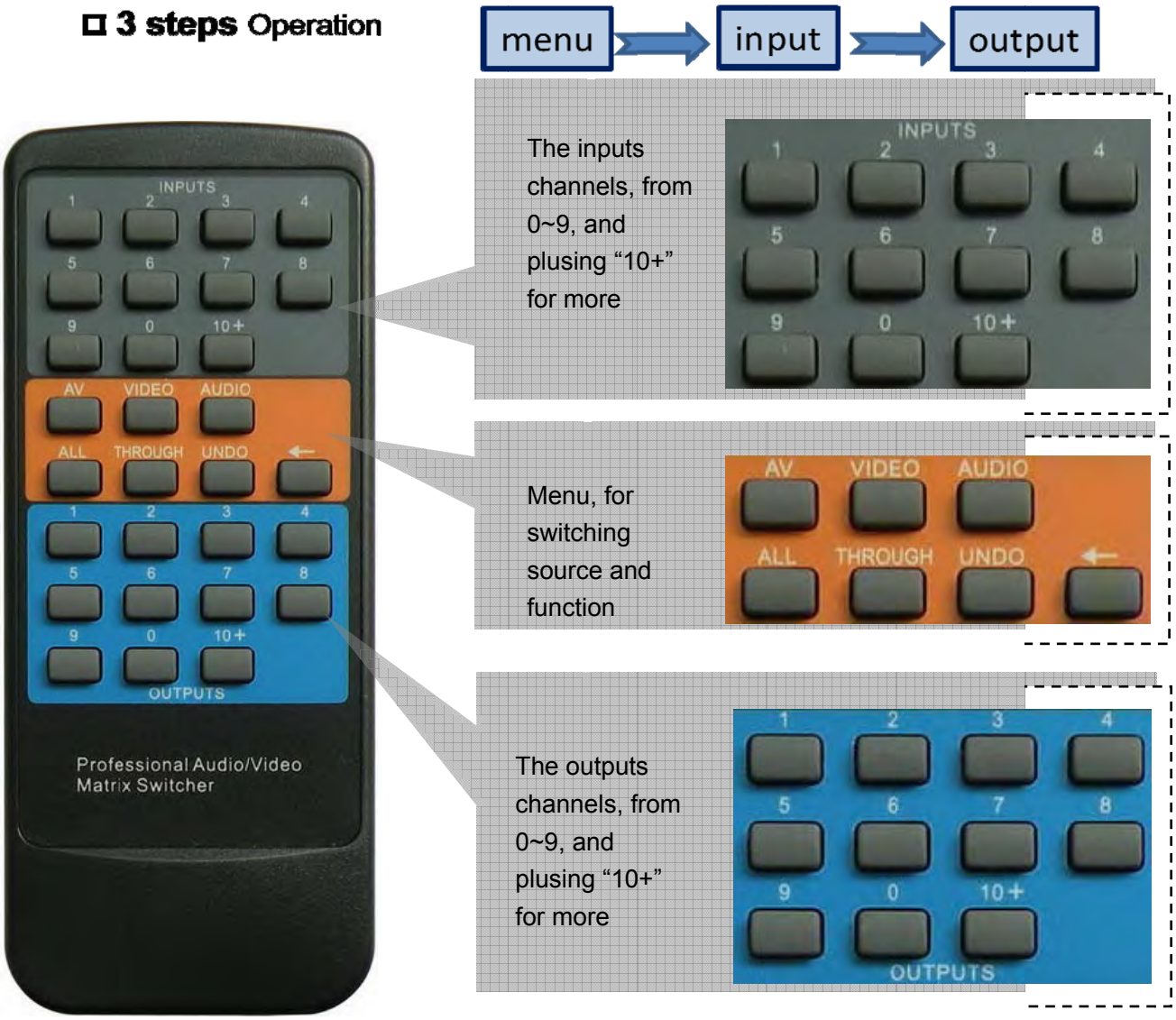
3,Press the button for the first output channel number “3”

4, Press the button for the second output channel number “4”

Then, switching OK ! audio/video switching from “1” to “3” and “4”

7. Usage of the Remote Controller

With the infrared remote controller, the matrix switcher could be control remotely. Because the function buttons on the remote controller are the same with the ones on the front control panel, the remote controller shares the same control operation and command format with the control panel.



8. Communication Protocol and Command Codes

With this command system, the RS232 software is able to control & operate the MRG Matrix remotely.

Communication protocol:

Baud rate: 9600 Data bit: 8 Stop bit: 1 Parity bit: none

Command Types	Command Codes	Functions
System Command	/*Type;	Inquire the models information.
	/%Lock;	Lock the keyboard of the control panel on the Matrix.
	/%Unlock;	Unlock the keyboard of the control panel on the Matrix.
	/^Version;	Inquire the version of firmware
	/:MessageOff;	Turn off the feedback command from the com port. It will only show the “switcher OK”.
	/:MessageOn;	Turn on the feedback command from the com port.
	Undo.	To cancel the previous operation.
	Demo.	Switch to the “demo” mode, 1->1, 2->2, 3->3 … and so on.
	[x1]All.	Transfer signals from the input channel [x1] to all output channels
	All#.	Transfer all input signals to the corresponding output channels respectively.
	All$.	Switch off all the output channels.
	[x1]#.	Transfer signals from the input channel [x1] to the output channel [x1].
	[x1]$.	Switch off the output channel [x1].
Operation Command （PTN2.0 Command System）	[x1] V[x2].	Transfer the video signals from the input channel [x1] to the output channel [x2].
	[x1] V[x2],[x3],[x4].	Transfer the video signals from the input channel [x1] to the output channels [x2], [x3] and [x4].
	[x1] A[x2].	Transfer the audio signals from the input channel [x1] to the output channel [x2].
	[x1] A[x2],[x3],[x4].	Transfer the audio signals from the input channel [x1] to the output channels [x2], [x3] and [x4].
	[x1] B[x2].	Transfer both the video and the audio signals from the input channel [x1] to the output channel [x2].
	[x1] B[x2],[x3],[x4].	Transfer both the video and the audio signals from the input channel [x1] to the output channels [x2], [x3] and [x4].
	Status[x1].	Inquire the input channel to the output channel [x1].
	Status.	Inquire the input channel to the output channels one by one.
	Save[Y].	Save the present operation to the preset command [Y]. [Y] ranges from 0 to 9.
	Recall[Y].	Recall the preset command [Y].
	Clear[Y].	Clear the preset command [Y].

Note:

1. [x1], [x2], [x3] and [x4] are the symbols of input or output channels ranged according to the model of the matrix switcher. If the symbols exceed the effective range, it would be taken as a wrong command.
2. In above commands, “[”and “]” are symbols for easy reading and do not need to be typed in

actual operation.

3. Please remember to end the commands with the ending symbols "." and ";".

Detail Examples:

1、 Transfer signals from an input channel to all output channels: [x1]All.

Example: To transfer signals from the input channel No.3 to all output channels. Run Command: "3All."

2、 Transfer all input signals to the corresponding output channels respectively: All#.

Example: If this command is carried out on an MVG1616-A matrix switcher, the status of it will be: 1->1, 2->2, 3->3, 4->4……16->16.

3、 Switch off all the output channels: All$.

Example: After running this command, there will be no signals on all the output channels.

4、 Check the version of the firmware: /^Version;

To check the version of the firmware.

5、 Switch off the detail feedback command from the COM port: /:MessageOff;

Switch off the detail feedback information from the COM port. But, it will leave the "switch OK" as the feedback, when you switch the matrix.

6、 Switch on the detail feedback command from the COM port: /:MessageOn;

Switch on the detail feedback information from the COM port. it will show the detail switch information when it switch. Example: when switch 1->2 for Audio, it will feedback "A0102".

7、 Transfer signals from an input channel to the corresponding output channel: [x]#.

Example: To transfer signals from the input channel No.5 to the output channel No.5. Run Command: "5#."

8、Switch off an output channel: [x]$.

Example: To switch off the output channel No.5. Run Command: "5$."

9、Switch video signals command: [x1] V[x2].

Example: To transfer the video signals from the input channel No.3 to the output channel No.5. Run Command: "3V5."

10、Switch audio signals command: [x1] A[x2].

Example: To Transfer the audio signals from the input channel No.10 to the output channel Run Command: "10A2."

11、Switch both video and audio signals synchronously: [x1] B[x2].

Example: To transfer both the video and the audio signals from the input channel No.120 to the output channel No.12,13,15. Run Command: "120B12,13,15."

12、Inquire the input channel to the output channel [x]: Status[x].

Example: To inquire the input channel to the output channel No.23. Run Command: "Status23."

13、Inquire the input channel to the output channels one by one: Status.

Example: To inquire the input channel to the output channels one by one. Run Command: "Status."

14、Save the present operation to the preset command [Y]: Save[Y].

Example: To save the present operation to the preset command No.7. Run Command: "Save7."

15、Recall the preset command [Y]: Recall[Y].

Example: To recall the preset command No.5. Run Command: "Recall5."

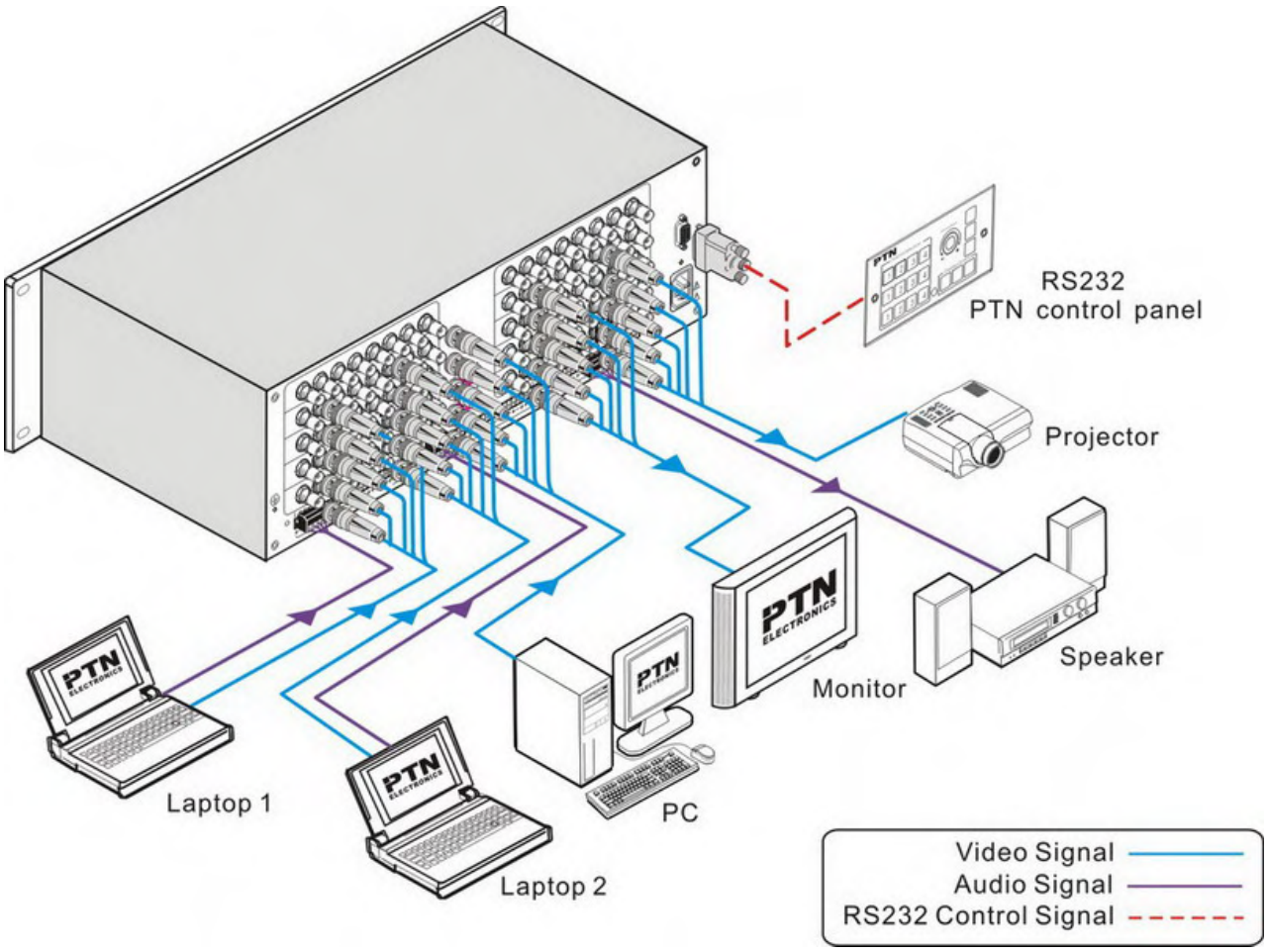
16、Clear the preset command [Y]: Clear[Y].

Example: To clear the preset command No.5. Run Command: “Clear5.”

9. Technical Specifications

Video Input		**Video Output**	
Input	8 RGBHV	Output	8RGBHV
Input Connector	Female BNC	Output Connector	Female BNC
Return Loss	<-30dB@5MHz	Return Loss	-30dB@5MHz
Input Level	0.5 ~ 2.0Vp-p	Output Level	0.5 ~ 2.0Vp-p
Input Impedence	75Ω	Output Impedence	75Ω
DC Offset	1.5V	Switching Type	Vertical interval
Video General			
Gain	0 dB	Bandwidth	450MHz (-3dB), fully load
Video Signal	RGBHV, RGBS, RGsB, RsGsBs, component video, S-video, and composite video.	Video Type	RGBHV, RGBS, RGsB, RsGsBs, component video, S-video, and composite video .
Switching Speed	200ns (Max.)	Crosstalk	<-80dB@5MHz
Audio Input		**Audio Output**	
Input	8 stereo, balanced/unbalanced	Output	8 stereo, balanced/unbalanced
Input Connector	Captive screw connectors, 5 pole	Output Connector	Captive screw connectors, 5 pole
Input Impedance	>10KΩ	Output Impedance	50Ω
Audio General			
Frequency Response	20Hz ~ 20KHz	CMRR	>90dB@20Hz~20KHz
Stereo Channel Separation	>80dB@1KHz	THD + Noise	0.03%@1KHz at nominal level
Control Parts			
Serial Control Port	RS-232, 9-pin female D connector	Pin Configurations	2 = TX, 3 = RX, 5 = GND
IR Remote	Default IR remote	Front Panel Control	Buttons
Options	TCP/IP control by PTNET(PTN's programmable interface)		
General			
Power Supply	100VAC ~ 240VAC, 50/60Hz	Power Consumption	30W
Temperature	-20 ~ +70℃	Humidity	10% ~ 90%
Case Dimension	W483 x H87 x D260mm (2U high, full rack wide)	Product Weight	4.5Kg

10. System Diagram



11. Troubleshooting & Maintenance

1) When the output image in the destination device connected to the MRG Matrix has ghost, such as the projector output with ghost, please check the projector's setting or try another high quality connection cord.

2) When there is a color losing or no video signal output, it may be the unmatched RGBHV connector order between the input and output end.

3) When the remote controller doesn't works:
   A. Maybe the battery is run out of, please change a new one.
   B. Maybe the controller is broken, please ask the dealer to fix it.

4) When user can not control the MRG Matrix by computer through its COM port, please check the

COM port number in the software and make sure the COM port is in good condition.

5) If there is not “beep” sound when switching the I/O signal, please make sure the beeper is switched on. If so, the beeper inside the matrix may be broken. Please send it to the dealer for fixing.

6) When switching , the beeper beeps but without any output image：
   A. Check with oscilloscope or multimeter if there is any signal at the input end. If there is no signal input, it may be the input connection cord broken or the connectors loosen.
   B. Check with oscilloscope or multimeter if there is any signal at the output end. If there is no signal output, it may be the output connection cord broken or the connectors loosen.
   C. Please make sure the destination device is exactly on the controlled output channel
   D. If it is still the same after the above checking, it may be something wrong in the switcher. Please send it to the dealer for fixing.

7) If the output image is interfered, please make sure the system is earthed well.

8) If the static becomes stronger when connecting the BNC connectors, it may be due to the incorrect earthing of the power supply, Please earth it again correctly, and otherwise it would bring damage to the switcher or shorten its natural life.

9) If the Matrix can not be controlled by the keys on the front panel, RS232 port or remote controller, the host may has already been broken. Please send it to the dealer for fixing.

55 Ruta Ct. South Hackensack, NJ 07606
Toll Free: **800 526-0242**
email:
sales@comprehensivecable.com
customerservice@comprehensivecable.com

www.comprehensivecable.com